REMARKS

This paper is being filed in response to the Office Action dated January 17, 2003 that was issued in connection with the above-identified patent application. Applicants enclose herewith a Petition for Extension of Time pursuant to 37 C.F.R. §1.136(a) and the fee required under 37 C.F.R. §1.17(a)(2). Applicants also enclose herewith an Information Disclosure Statement and Form PTO-1449. Applicants respectfully request reconsideration of the instant application in view of the amendments and remarks presented herein.

Claims 1-9 are pending. Claims 1-9 have been amended and will remain pending upon entry of the instant Amendment.

Marked-up claims appear in the preceding "IN THE CLAIMS" section. Attached hereto is a clean version of the changes made by the instant amendment. The attached pages are captioned "CLEAN VERSION FOR EXAMINER'S CONVENIENCE." Should any discrepancies be discovered, the version presented in the preceding "IN THE CLAIMS" section shall take precedence.

Support for the amendment to claims 1, 5, and 9 inserting the term "waterborne" may be found in the specification as filed, *inter alia*, at the page 3, lines 20-22 and the abstract. Additional support for this change may be found in the product literature related to PAPHEN® phenoxy resins available at http://www.eastechchemical.com/prdc/func/docs/01-Phenoxy_Product_Guide.pdf (last accessed May 19, 2003) (hereinafter "Eastech"), a copy of which is enclosed herewith and listed on the enclosed Form PTO-1449. Applicants assert, therefore, that this amendment does not constitute new matter.

Support for the amendment to claims 2 and 9 deleting "melanine" in favor of "melamine" is supported by the specification as originally filed, inter alia, at page 3, line 17 and the abstract. Applicants assert, therefore, that this amendment does not constitute new matter.

Support for the amendment to claims 1, 5, and 9 inserting the term "first" and the phrase "wherein said first resin solution comprises the largest portion by weight of all of the other components individually" may be found in the specification as originally filed at page 3, line 20 to page 4, line 3, where the quantity of additives is expressed in relative terms with respect to the phenoxy resin. Further support may be found at page 7, lines 22-23. Applicants assert, therefore, that this amendment does not constitute new matter.

As a preliminary matter, Applicants thank the Examiner for withdrawing the rejections set forth in the Office Action dated June 4, 2002 (Paper 5). Full consideration of Applicant's arguments is appreciated.

Specification Provides Proper Antecedent Basis for the Claims

An objection to the specification has been made as allegedly lacking proper antecedent basis for the term "water soluble" phenoxy resin pursuant to 37 C.F.R. § 1.75(d)(1) and MPEP § 608.01. The Examiner has noted that the specification recites a "water dispersed" phenoxy resin in Example 1 and alleged that a water soluble phenoxy resin is not the same as a water dispersed phenoxy resin. On this basis, the Examiner has alleged that claims 2-4 and 9 are not supported by the specification.

Applicants traverse this objection and assert that the specification, when viewed in light of the available art, fully supports the claims as amended herein. Claims 1, 5, and 9 have been amended to recite the term "waterborne." Applicants respectfully invite the Examiner's attention to the specification at page 3, lines 20-22 and the abstract, which both use the term

"water-soluble phenoxy resin." In addition, support for the term "waterborne" may be found in Eastech. Applicants respectfully invite the Examiner's attention to Example 1, wherein phenoxy resin PKHW-35 is used. *See* page 14, lines 3-5. Applicants further respectfully invite the Examiner's attention to page 3 of Eastech, wherein PKHW-35 is listed under a heading captioned "PAPHEN® Phenoxy Waterborne Dispersions."

Applicants acknowledge that the specification at page 14, line 2 uses the expression "[r]esin solution dispersed in water." However, Applicants traverse the Examiner's characterization of the instant invention as a dispersion in that dispersions and emulsions require a dispersing agent or emulsifying agent to obtain and maintain a stable state, whereas the instant invention does not require a surfactant. *See e.g.* Example 1. Applicants referred to the solutions of the invention as "water-soluble" in the specification as originally filed to mark this distinction over "dispersions." Applicants also chose this term because some phenoxy particle sizes within the scope of the claimed invention exist in solution, while others exist as dispersions. Nevertheless, Applicants have amended claims to recite the term "waterborne" to avoid confusion with solubility as some persons of ordinary skill in the art would view solubility and, yet, retain the substantially free of surfactant aspect. No change in meaning or claim scope is intended and, therefore, Applicants do not concede that the instant substitution constitutes a surrender of any subject matter. Therefore, the specification fully supports the instant claimed invention and, therefore, Applicants respectfully request withdrawal of this objection.

Claims Are Free of Misspelled Terms

A objection has been made to claim 9 for reciting "melanine", which the Examiner noted is a misspelling of the term "melamine." Applicants have amended claims 2 and 9 to correct this misspelling and, therefore, respectfully request withdrawal of this objection.

Claims Are Clear and Definite

Claims 1-9 have been rejected under 35 U.S.C. § 112, ¶2 as allegedly indefinite in reciting the term "main." Claims 1 and 5 have also been rejected as allegedly indefinite for improperly introducing a Markush group. Claims 4, 8, and 9 have been rejected as allegedly indefinite for insufficiently defining the term "average particle size."

Applicants assert that the claims, as amended herein, obviate this rejection and are clear and definite.

Claims Are Nonobvious

Claims 1 and 5-8 have been rejected under 35 U.S.C. §103(a) as unpatentable over WO 98/45114 of Ogata et al. (hereinafter "Ogata"), in view of U.S. Patent No. 5,330,850 to Suzuki et al. (hereinafter "Suzuki"), and further in view of U.S. Patent No. 5,612,394 to Pfeil et al. (hereinafter "Pfeil"). For the purpose of examination of the instant application, the Examiner has relied upon U.S. Patent No. 6,235,407 as the English equivalent of Ogata. The Examiner has alleged that Ogata teaches a steel sheet for an automobile fuel tank, wherein the steel sheet has been coated with an organic resin film that contains a metal powder, amine modified epoxy resins, including phenoxy resins. The Examiner has alleged that the phenoxy resin of Ogata is equivalent to Applicant's "main" resin.

Applicants traverse these rejections and allegations and assert that the instant claimed invention is not obvious in view of the cited documents. To make a prima facie case of obviousness, the cited documents must teach or suggest every element of the claimed invention. *See e.g.* MPEP § 2143.03. Applicants assert that Ogata, Suzuki, and Pfeil, whether considered alone or in combination, do not teach or suggest a **waterborne** phenoxy resin.

The instant claims, as amended herein, recite "waterborne" resins. For example, claim 1 recites "waterborne" in the preamble. Applicants assert that the term "waterborne," as recited in instant claim 1, breathes life and meaning into the claim and, therefore, should not be treated as a statement of purpose or intended use. *See* MPEP §2111.02; *see also Kropa v. Robie*, 187 F.2d 150, 88 USPQ 478 (CCPA 1951).

All of the resins taught by Ogata are solvent-type resins, not waterborne type resins. Ogata specifically teaches that its epoxy resins are solvent-base at column 13, lines 17-24. None of the Ogata's resins is specifically denominated as being water-soluble or waterborne. Moreover, many phenoxy resins are solvent based. Applicants again respectfully invite the Examiner's attention to Eastech and note that there are a variety of solvent-based phenoxy resins noting that only 2 of the resins disclosed are listed as "waterborne." Applicants assert, therefore, that in view of the weight of the teaching of Ogata directed toward solvent-based resins, the specific teaching indicating the resins are solvent-based, and the complete absence of any resin specifically identified as waterborne, Ogata fails to teach a waterborne resin.

Applicants respectfully observe that waterborne phenoxy resins have many substantial advantages over solvent-based resins as one of ordinary skill in the art would readily appreciate. For example, waterborne resins do not require the equipment or risks (e.g. explosion) associated with solvent removal. In addition, it has been very difficult to prepare a resin comprising both a silica-containing aqueous solution and a metal power-containing solvent-based solution.

Moreover, Ogata itself acknowledges the difference between solvent-based and waterborne resins, albeit indirectly. Ogata teaches that a silica-containing resin film with a glass temperature over 90° C will be too brittle and display poor workability. *See* Ogata, col. 11, lines

30-40. In contrast, waterborne resins of the instant invention comprising colloidal silica, metal powder, Teflon, etc. display desirable characteristics, yet have a glass temperature of 100° C. *See* specification, page 6, line 23 to page 7, line 1.

Like Ogata, Suzuki fails to teach a waterborne resin coating solution. Suzuki teaches, at most, that a water-soluble resin may be added in **minor amounts**. *See* Suzuki, col. 9, line 67 to col. 10, line 5 ("Other additives which can be added to the coating composition based on an organic resin in **minor amounts** include ... water-soluble resins such as polyvinyl alcohols, polyacrylic acids, and polyacrylamides, and other resins")(emphasis added). Even so, waterborne phenoxy resins are not specifically enumerated. Therefore, Suzuki fails to teach or suggest waterborne resins of the instant invention.

Pfeil similarly fails to teach or suggest a waterborne phenoxy resin of the instant claimed invention. Pfeil appears to teach an aqueous epoxy resin dispersion. However, this dispersion is not like the waterborne resin of the invention in several respects. First, Pfeil totally fails to teach or suggest a phenoxy resin of any kind. Second, Pfeil reaches an epoxide equivalent mass of from 100 to 2000 g/mol. See e.g. abstract and claim 1. This size is far smaller than the number average molecular weight of the resins of the instant invention, which are from 25,000 to 50,000. Applicants assert that one of ordinary skill in the art would not be motivated to modify this composition in combination with Ogata and/or Suzuki to arrive at the claimed invention for at least two reasons. First, the polymer size is so small, that increasing the size to arrive at the instantly claimed range of 25,000 to 50,000 would dramatically alter the properties of the Pfeil resin and make it inoperative for its intended function. Second, altering Pfeil by substituting the solvent-based resin of Ogata or Suzuki would also dramatically alter the resin properties. For example, it is doubtful that anything remotely resembling the resin of Pfeil

would result from such a combination as the solvent-based resins of Ogata and Suzuki would be immiscible in the solution of Pfeil.

For the foregoing reasons, Ogata, Suzuki, and Pfeil, whether considered alone or in combination fail to teach the instant claimed invention. Applicants, therefore, respectfully request withdrawal of this rejection.

Claims Are Patentable over Lee

Claims 1-9 have further been rejected under the judicially-created doctrine of obviousness-type double patenting as allegedly unpatentable over claims 15, 25, and 31 of U.S. patent No. 6,387,538 to Lee et al. (hereinafter "Lee") in view of Ogata. The Examiner has alleged that the only difference between the claims of Lee and the instant invention is the addition of 2-10 PTFE based lubricant.

Applicants traverse this rejection and assert that the instant claimed invention is patentable over Ogata and Lee. As the Examiner has acknowledged, claims 15, 25, and 31 of Lee do not recite PTFE. Applicants respectfully assert that the Examiner's reliance on Ogata is misplaced since Ogata is limited to solvent-based resins. Therefore, one of ordinary skill in the art would not have been motivated to make the asserted combination. Therefore, Applicants assert that the instant claims are nonobvious over and patentably distinct from Lee and Ogata and respectfully request withdrawal of this rejection.

Applicants enclose herewith the fee required under 37 C.F.R. §1.17(a)(1). Applicants do not believe that any additional fees are required with this paper. Nevertheless, the Commissioner is hereby authorized to charge any fees occasioned by this submission not otherwise enclosed herewith to Deposit Account No. 02-4377. Please credit any overpayment of fees associated with this filing to the above-identified deposit account. A duplicate of this page is enclosed.

Respectfully submitted,

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Rochelle K. Seide
PTO Reg. No. 32,300

Neil P. Sirota
PTO Reg. No. 38,306
Attorneys for Applicants

Guy F. Birkenmeier
PTO Reg. No. 52,622
Agent for Applicants

BAKER BOTTS, L.L.P.
30 Rockefeller Plaza
New York, NY 10112
(212) 408-2500

Enclosures

CLEAN VERSION FOR EXAMINER'S CONVENIENCE

1. A waterborne resin solution for preparing a resin-coated steel sheet for a fuel tank of an automobile comprising:

a first resin solution selected from the group consisting of epoxy resin, urethane resin and phenoxy resin;

melamine resin;

colloidal silica;

PTFE-based wax; and

at least one plate-type metallic powder selected from the group consisting of Al, Zn, Mn, Co, Ni, Sn and SnO,

wherein said waterborne resin solution is substantially free of surfactant and said first resin solution comprises the largest portion by weight of all of the other components individually.

2. The resin solution of claim 1, wherein said first resin solution is a water-soluble phenoxy resin that has a number average molecular weight of 25,000 to 50,000;

said melamine resin is added in the amount of 2 to 15 phr on the basis of said first solution;

said colloidal silica is added in the amount of 10 to 20 phr on the basis of said first solution;

said PTFE-based wax is added in the amount of 2 to 10 phr on the basis of said first solution; and

said metallic powder is added in the amount of 5 to 70 phr on the basis of said first solution.

3. The resin solution of claim 2, wherein said PTFE-based wax has a particle size of 0.1 - 3 μm.

4. The resin solution of claim 3, wherein said metallic powder has length along its longest axis of 0.5-5 μm.

5. The method of fabricating resin-coated steel sheet for a fuel tank of an automobile comprising the steps of:

coating a waterborne resin solution comprising a first resin solution of phenoxy resin having a number average molecular weight of 25,000 to 50,000; 2 to 15 phr of melamine resin on the basis of said first solution; 10 to 20 phr of colloidal silica on the basis of said first

solution; 2 to 10 phr of PTFE-based wax on the basis of said first solution; and 5 to 70 phr of at least one plate-type metallic powder selected from the group consisting of Al, Zn, Mn, Sn, and SnO, wherein said first resin solution is the largest portion of all of the other components individually; and

baking drying said resin-coated steel sheet at 140-250°C.

6. The method of fabricating resin-coated steel sheet of claim 5, wherein thickness of said resin coating is 1-10 μm based on dried coating thickness.

7. The method of fabricating resin-coated steel sheet of claim 6 wherein the particle size of the PTFE-based wax of said resin solution is 0.1 to 3 μm.

8. The method of fabricating resin-coated steel sheet of claim 7, wherein the length of metallic powder of said resin solution along its longest axis is 0.5-5 μm.

9. A resin-coated steel sheet for a fuel tank of an automobile comprising a first waterborne resin

solution of water-soluble phenoxy resin having a number average molecular weight of 25,000 to 50,000;

2 to 15 phr of melamine resin on the basis of said first solution;

10 to 20 phr of colloidal silica on the basis of said first solution;

2 to 10 phr of PTFE-based wax on the basis of said first solution; and

5 to 70 phr of at least one metallic powder selected from the group consisting of Al, Zn, Mn, Co, Ni, Sn, and SnO on the basis of said first solution and with a particle size of 0.5 - 5 μm along the longest axis, said resin solution coated in the thickness of 1 - 10 μm based on dried coating thickness.

wherein said first resin solution is the largest portion of all of the other components individually.